

**REMARKS**

Reconsideration and allowance of the subject application are respectfully requested. Applicants thank the Examiner for total consideration given the present application. Claims 44-101 were pending prior to the Office Action. No claims have been added through this reply. No claims have been canceled through this reply. Therefore, claims 44-101 are pending. Claims 44, 48, 51, 54-57, 62-64, 71, 81, 84-85, and 88-102 are independent. The Examiner has withdrawn pending claims 48-59, 62-87, and 89-101 from consideration. Applicants respectfully request reconsideration of the rejected claims in light of the remarks presented herein, and earnestly seeks a timely allowance of all pending claims.

**Examiner's Restriction Requirement is Improper as Indicated in the Last Response**

The Examiner has required an election in the present application between:

Species 1, corresponding to claims 44-47, 60-61, and 88; which allegedly corresponds to a waveform shaping method comprising in which waveform shaping is carried out by making that pulse width of the input signal which is recognized from the sampling signal closer to a predetermined pulse width, irrespective of the pulse width;

Species 2, corresponding to claims 48-50, 52, 60-61, 82, and 89; which allegedly corresponds to a waveform shaping is carried out by shortening, by a predetermined value, that pulse width of the input signal which is recognized from the sampling signal, irrespective of the pulse width;

Species 3, corresponding to claims 51, 53, 60-61, 82, and 90; which allegedly corresponds to a waveform shaping is carried out by lengthening, by a predetermined value, that pulse width of the input signal which is recognized from the sampling signal, irrespective of the pulse width;

Species 4, corresponding to claims 54, 58-61, and 91; which allegedly corresponds to a waveform shaping is carried out by making that pulse width of the input signal which is recognized from the sampling signal closer to a minimum pulse width of the input signal in the sampling signal, irrespective of the pulse width;

Species 5, corresponding to claims 55 and 92; which allegedly corresponds to a waveform shaping is carried out by making that pulse width of the input signal which is recognized from the sampling signal equal to or smaller than a minimum pulse width of the input signal in the sampling signal, irrespective of the pulse width;

Species 6, corresponding to claims 56 and 93; which allegedly corresponds to a waveform shaping is carried out by making that pulse width of the input signal which is recognized from the sampling signal equal to an inverse number of the sampling clock frequency, irrespective of the pulse width;

Species 7, corresponding to claims 57, 60-61, and 94; which allegedly corresponds to a waveform shaping step being such that (I) a no-pulse period, which is recognized from the sampling signal, is detected, and (II) if the no-pulse period is less than a setting value, waveform shaping is so carried out, irrespective of a pulse width, as to modify the no-pulse period to the setting value by (i) shifting a position of a pulse adjacent to the no-pulse period or (ii) shaping the pulse;

Species 8, corresponding to claims 62, 65, 68, 75-80, 83, and 95; which allegedly corresponds to a waveform shaping step being such that (I) a pulse width recognized from the sampling signal is compared with (i) a first reference value, and (ii) a second reference value which is larger than the first reference value by a constant value, and (II) if the pulse width is equal to or larger than the second reference value, the pulse width is reduced by the constant value, irrespective of the pulse width;

Species 9, corresponding to claims 63, 66, 69, 75-80, and 96 (which the Examiner failed to identify); which allegedly corresponds to a waveform shaping step being such that (I) a pulse width recognized from the sampling signal is compared with (i) a first reference value, and (ii) a second reference value which is larger than the first reference value by a constant value, and (II) if the pulse width is larger than the first reference value but less than the second reference value, the pulse width is reduced, irrespective of the pulse width, so that the pulse width is made as close to the first reference value as possible;

Species 10, corresponding to claims 64, 67, 70, 75-78, and 97; which allegedly corresponds to a waveform shaping step being such that (I) a pulse width recognized from the

sampling signal is compared with (i) a first reference value, and (ii) a second reference value which is larger than the first reference value by a constant value, and (II) the pulse width is not reduced if the pulse width is equal to or less than the first reference value;

Species 11, corresponding to claims 71-75 and 98; which allegedly corresponds to a waveform shaping step being such that (I) a pulse interval recognized from the sampling signal is compared with an interval reference value, and (II) if the pulse interval is less than the interval reference value, the pulse interval is lengthened, irrespective of a pulse width, by (i) shifting a position of a pulse adjacent to the no-pulse period for (ii) shaping the pulse so that the pulse interval is made as close to the interval reference value as possible, the pulse interval being a width of a period having no pulse;

Species 12, corresponding to claims 81 and 99; which allegedly corresponds to a waveform shaping step being such that (I) a width of the pulse in the input signal is compared with a reference range determined in accordance with the width of the pulse, and (II) if the width of the pulse is out of the reference range, waveform shaping is so carried out as to make the width of the pulse fall within the reference range;

Species 13, corresponding to claims 84 and 100; which allegedly corresponds to a waveform shaping means compares a first symbol count with a first reference value and a value which is a constant value larger than the first reference value, where (i) the first symbol count is a number of symbols in a first symbol string having been replaced for a pulse-existing period, and (ii) a second symbol count is a number of symbols in a second symbol string having been replaced for a no-pulse period adjacent to the pulse-existing period, and if the first symbol count is equal to or more than the second reference value, the waveform shaping means partially replaces the first symbol string with the second symbol string by the constant value, irrespective of a pulse width of the pulse signal generated through the signal processing, so as to shorten the pulse-existing period; and

Species 14, corresponding to claims 85 and 101; which allegedly corresponds to a waveform shaping means compares a second symbol count with an interval reference value, where (i) the first symbol count is a number of symbols in a first symbol string having been replaced for a pulse-existing period, and (ii) a second symbol count is a number of symbols in a

second symbol string having been replaced for a no-pulse period adjacent to the pulse-existing period, and if the second symbol count is less than the interval reference value, the waveform shaping means partially replaces the first symbol string with the second symbol string in such a manner that the second symbol count is equal to the interval reference value, irrespective of a pulse width of the pulse signal generated through the signal processing, so as to lengthen the no-pulse period.

**For the purpose of examination of the present application, Applicants elected Species I, with traverse, where claim(s) 44-47, 60, 61 and 88 are directed to the elected species.**

**However, the Examiner did not address Applicants argument based on the Examiner's improper Restriction Requirement. The Examiner is respectfully asked to read the following arguments and reconsider the improper Restriction Requirement.**

In electing Species 1, the Examiner should consider that the features of Species 1 is generic to the features of Species 1, 4, 6, and 9.

The features of Species 1, 4, 6, and 9 are the following underlined parts.

(1) Species 1

Waveform shaping is carried out by making that pulse width of the input signal which is recognized from the sampling signal closer to a predetermined pulse width, irrespective of the pulse width.

(2) Species 4

Waveform shaping is carried out by making that pulse width of the input signal which is recognized from the sampling signal closer to a minimum pulse width of the input signal in the sampling signal, irrespective of the pulse width.

(3) Species 6

Waveform shaping is carried out by making that pulse width of the input signal which is recognized from the sampling signal equal to an inverse number of the sampling clock frequency, irrespective of the pulse width.

(4) Species 9

The waveform shaping step being such that (I) a pulse width recognized from the sampling signal is compared with (i) a first reference value, and (ii) a second reference value which is larger than the first reference value by a constant value, and (II) if the pulse width is larger than the first reference value but less than the second reference value, the pulse width is reduced, irrespective of the pulse width, so that the pulse width is made as close to the first reference value as possible.

The feature of Species 1 of "making that pulse width ...closer to a predetermined pulse width" is generic (comprehensive concept) to the underlined features of Species 4, 6, and 9. To be more specific, "a predetermined pulse width" in Species 1 is embodied as "a minimum pulse width of the input signal in the sampling signal" in Species 4, "(pulse width) equal to an inverse number of the sampling clock frequency" in Species 6, and "the first reference value" in Species 9.

Therefore, at a minimum, the Examiner should examine Species 1, 4, 6, and 9 together. However, if the Examiner maintains the Species requirement, then the Examiner should be aware that if Species 1 would be considered as being patentable by the Examiner, then at least Species 4, 6, and 9 should be patentable and also be allowed.

Also, the Examiner did not include claim 96 in the Species Requirement. Applicants have incorporated claim 96 into Species 9.

### **Allowable Subject Matter**

Applicants appreciate that claims 46, 47, and 61 are not rejected by prior art and thus indicating claims 46, 47, 61 to define allowable subject matter.

### **Claim Rejection - 35 U.S.C. § 112, second paragraph**

The Examiner rejected claims 44-47 and 60-61 under 35 U.S.C. § 112, second paragraph, asserting that they are allegedly indefinite for the limitation of "the waveform shaping step being such that, when the input signal is a pulse signal for use in a fixed-pulse-width method, the pulse signal being generated through a signal processing carried out with respect to an original pulse signal on which the input signal is based, waveform shaping is carried out by making that pulse

width of the input signal which is recognized from the sampling signal closer to a predetermined pulse width, irrespective of the pulse width". Applicants have removed the expression "for use in a fixed-pulse-width method" making the Examiner's rejection moot.

However, for the purpose of explaining the claimed invention to the Examiner so that he is no longer confused, the claimed invention includes receiving an input signal with a certain pulse width and making the input signal with the certain pulse closer to a predetermined pulse width. Therefore, based on the amendment and the explanation, the Examiner is respectfully requested to withdraw the outstanding rejection.

#### **Claim Rejection - 35 U.S.C. § 101**

The Examiner rejected claims 44-47 and 60-61 asserting that claims 44-47 and 60-61 are not directed to statutory subject matter. By this amendment, Applicants have amended claims 44-47 and 60-61 as directed by the Examiner. As such, Applicants respectfully submit that claims 44-47 and 60-61 are directed to statutory subject matter. Based on these amendments, it is respectfully requested that the outstanding rejection be withdrawn.

#### **Claim Rejection - 35 U.S.C. § 103(a)**

Claim 44 stands rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Schuppe et al. (U.S. Patent 6,198,766) in view of Lee et al. (U.S. Patent Publication 2004/0223545). Claims 45, 60, and 88 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Schuppe and Lee in view of additional references. Applicants respectfully traverse this rejection.

For a Section 103 rejection to be proper, a *prima facie* case of obviousness must be established. See *M.P.E.P. 2142*. One requirement to establish a *prima facie* case of obviousness is that the prior art references, when combined, must teach or suggest all claim limitations. See *M.P.E.P. 2142*; *M.P.E.P. 706.02(j)*. Thus, if the cited references fail to teach or suggest one or more elements, then the rejection is improper and must be withdrawn.

**Argument: Features of claims 44 and 88 are not taught:**

Applicants have amended independent claims 44 and 88 merely to further clarify the invention in order to move prosecution forward. Independent claims 44 and 88 have been amended to include additional limitations. More specifically, claim 44 as amended recites, *inter alia*, “a waveform shaping step for processing the sampling signal, so that a pulse in the input signal, recognized from the sampling signal, is shaped, where the waveform shaping step is performed by a processor, the waveform shaping step being such that, when the input signal is a pulse signal for use, the pulse signal being generated through a signal processing carried out with respect to an original pulse signal on which the input signal is based, waveform shaping is carried out by making that pulse width of the input signal which is recognized from the sampling signal closer to a predetermined pulse width, irrespective of the pulse width, wherein the predetermined pulse width is determined so that the pulse width of the input signal is made closer to the pulse width of the original pulse signal.” *Emphasis added.*

In the pulse shaper 100 of Schuppe, in order to improve the reliability of the demodulation processing by the demodulator 1, the shift register 13 performs the waveform shaping of the input signal 23. (See Schuppe, col.4, lines 18-39.)

Thus, the comparator 12 compares the value of each register of the shift register 13 with the predetermined range, and then outputs the comparison result to Chop Decoder 14 and Add Decoder 15. The predetermined range is the acceptance range of the demodulator 1. (See Schuppe, col. 5, lines 7-16.)

On the other hand, the claimed method of amended claim 44 performs the waveform shaping so that the pulse width of the input signal, which is recognized from the sampling signal, is made closer to the predetermined pulse width.

Thus, this enables correction of the distortion of the signal-wave form generated at the time of the signal processing. (See specification, page 27, lines 10-19.)

In the claimed method of amended claim 44, the predetermined pulse width is determined so that the pulse width of the input signal is made closer to the pulse width of the original pulse signal. (See specification, line 17 of page 11 through line 20 of page 12.)

Therefore, it is clear that the contents of the predetermined range (correspond to the predetermined pulse width of amended claim 44), which is a target that the pulse width of the input signal is made closer to, disclosed in Schuppe and those disclosed in amended claim 44 are different. Thus, Schuppe does not disclose a waveform shaping step for processing the sampling signal, so that a pulse in the input signal, recognized from the sampling signal, is shaped, where the waveform shaping step is performed by a processor, the waveform shaping step being such that, when the input signal is a pulse signal for use, the pulse signal being generated through a signal processing carried out with respect to an original pulse signal on which the input signal is based, waveform shaping is carried out by making that pulse width of the input signal which is recognized from the sampling signal closer to a predetermined pulse width, irrespective of the pulse width, wherein the predetermined pulse width is determined so that the pulse width of the input signal is made closer to the pulse width of the original pulse signal as recited in claim 44.

Lee merely discloses a multi-level pulse width modulation (multi-level PWM) technique that uses multiple voltage levels and/or multiple output channels to obtain improved resolution. Thus, Lee does not make up for the deficiencies of Schuppe.

Claim 44 is submitted to be allowable over Schuppe and Lee for at least this reason.

Independent claim 88 is allowable for similar reasons as set forth above in reference to independent claim 44.

Dependent claims 45 and 60 are allowable for the reasons set forth above with regards to claim 44 at least based on their dependency on claim 44.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 44-45, 60, and 88 under 35 U.S.C. § 103(a).

Reconsideration and allowance of claims 44-45, 60, and 88 are respectfully requested for at least these reasons.

## Conclusion

Therefore, for at least these reasons, claims 44-45, 60, and 88 are believed to be distinguishable over the combination of cited prior art, individually or in any combination. It has been shown above that the cited references, individually or in combination, may not be relied



upon to show at least these features. Therefore, all claims are distinguishable over the cited references.

In view of the above remarks and amendments, it is believed that the pending application is in condition for allowance.

Applicants respectfully request that the pending application be allowed.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Aslan Ettehadieh Reg. No. 62,278 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

By 

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